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through only multicast capable routers, wherein the multicast routing table includes a plurality of routing entries, and wherein routing entries are placed in the multicast routing table only for link state advertisements having the multicast capable bit set indicating that the associated router is a multicast router.” In other words, claim 1 is distinguished because a multicast bit is used to distinguish multicast capable routers from multicast incapable routers, and the resulting information used to construct a multicast table which accounts for some routers being incapable of multicast. In view of the above, Applicant respectfully requests that the rejection of claim 1.

The cited references actually describe the problem that is solved by the present invention. As recited in the specification starting at page 7, with regard to Figure 7, multicast operation may break down when only a portion of the routers in the network support multicast operation. This occurs because the multicast table is generated from unicast link state advertisements. When a multicast packet is received by a router on a path which is the shortest multicast path BUT NOT the shortest unicast path, the packet is discarded because its path does not match the multicast table. Shah clearly operates in this problematic manner given that in section 2.1 in the second paragraph Shah states “in MOSPF, the MOSPF-compatible routers maintain a current image of the network topology using the unicast OSPF link-state protocol.” Similarly, Deering is silent on the problem of a mixed-capability network and the illustrated examples assume that all nodes are capable of multicast operation. The Examiner suggests that Deering shows the multicast capable bit at page 92. In particular, the Examiner cites “multicast addresses including multicast address of group members associated with the multicast router.” However, there is no evidence in the Examiner’s citation or the associated section of the reference that a bit or anything else is used to indicate whether a router is capable of multicast operation. In contrast, the present invention

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distinguishes between multicast capable and multicast-incapable routers to produce a more accurate multicast table which enables operation in a mixed capability network.

Claims 13 and 17 distinguish the cited references in a manner similar to that described with regard to claim 1. For example, claim 13 recites constructing a multicast routing table correlating addresses of destination multicast capable routers with addresses of multicast capable routers on a short path tree of multicast capable routers, and performing reverse path forwarding using the multicast routing table upon receipt of a multicast packet. In contrast, the cited references would perform reverse path forwarding using a table that fails to distinguish between multicast-capable and multicast-incapable routers. Claim 17 recites examine each link state advertisement to determine whether the link state advertisement includes a multicast capable bit indicating whether an associated router supports multicasting. In contrast, the cited combination does not employ a multicast capable bit and fails to distinguish between multicast-capable and multicast-incapable routers. Claims 2-4, 6, 7, 9-12, 15-16, 18-20 and 22 further distinguish the invention. In view of the above, Applicant respectfully requests that the rejection of claims 2-4, 6, 7, 9-13, 15-20 and 22 be withdrawn and the claims allowed.

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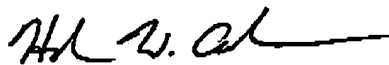
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Applicants have made a diligent effort to place the claims in condition for allowance. However, should there remain unresolved issues that require adverse action, it is respectfully requested that the Examiner telephone Holmes W. Anderson, Applicants' Attorney at 978-264-6664 so that such issues may be resolved as expeditiously as possible.

For these reasons, and in view of the above amendments, this application is now considered to be in condition for allowance and such action is earnestly solicited.

Respectfully Submitted,

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Date


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1. (currently Amended) A method of multicast routing with a multicast capable router in a network including a plurality of routers, wherein only a subset of the routers are capable of multicast, comprising the steps of:

receiving, at the multicast capable router, link state advertisements from routers in a the network; and

examining, at the multicast capable router, each link state advertisement to determine whether the link state advertisement includes a multicast capable bit indicating whether an associated router supports multicast;

employing the received link state advertisements for constructing a multicast routing table and a unicast routing table from the received link state packets, the multicast routing table corresponding to a short path tree through only multicast capable routers, wherein the multicast routing table includes a plurality of routing entries, and wherein routing entries are placed in the multicast routing table only for link state advertisements having a the multicast capable bit set indicating that the associated router is a multicast router,

whereby the multicast capable router is able to recognize and forward a multicast packet that is received via a path that is not indicated as the shortest path in the unicast routing table.

2. (currently Amended) The method of claim 1, ~~wherein the~~ including the further step of routing multicast packets further comprising performing reverse path forwarding using the multicast routing table in support of routing multicast packets.

3. (Original) The method of claim 1 wherein the link state advertisements comprise OSPF (Open Short Path First) link state advertisements.

4. (Original) The method of claim 1 wherein the link state advertisements comprise MOSPF (Multicast Open Short Path First) link state advertisements.

5. (Cancelled) The method of claim 1 wherein constructing the multicast routing table comprises determining if a router is a multicast router.

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6. (Original) The method of claim 1 wherein constructing the multicast routing table comprises using Dijkstra's short path algorithm.
7. (Original) The method of claim 1 wherein the multicast routing table correlates addresses of destination multicast capable routers with addresses of multicast capable routers on a short path tree of multicast capable routers.
8. (Cancelled)
9. (Original) The method of claim 1 wherein using the multicast routing table comprises configuring PIM (Protocol Independent Multicasting) to use the multicast routing table.
10. (Original) The method of claim 9 wherein configuring comprises providing a routine for a PIM RPF_Check function.
11. (Previously Amended) The method of claim 1 wherein PIM uses the multicast routing table to perform reverse path forwarding in sparse mode.
12. (Previously Amended) The method of claim 1, wherein PIM uses the multicast routing table to perform reverse path forwarding in dense mode.
13. (Previously Amended) A method of multicast routing, comprising:
- receiving MOSPF (Multicast Open Short Path First) link state advertisements from routers in a network;
 - constructing a multicast routing table and a unicast routing table from the received link state packets, the multicast routing table correlating addresses of destination multicast capable routers with addresses of multicast capable routers on a short path tree of multicast capable routers, wherein the multicast routing table includes a plurality of routing entries, and wherein routing entries are placed in the multicast routing table only for link state advertisements having a multicast capable bit set indicating that the associated router is a multicast router; and

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performing reverse path forwarding using the multicast routing table upon receipt of a multicast packet.

14. (Cancelled)

15. (Previously Amended) The method of claim 13 wherein multicast routing comprises routing in accordance with the Protocol Independent Multicasting (PIM) protocol.

16. (Previously Amended) The method of claim 13 wherein multicast routing comprises routing in accordance with the Protocol Independent Multicasting (PIM) protocol.

d 17. (currently Amended) A computer program product, disposed on a computer readable medium, for multicast routing, the computer program including instructions for causing a computer to:

receive link state advertisements from routers in a network; ~~and to~~
examine each link state advertisement to determine whether the link state advertisement includes a multicast capable bit indicating whether an associated router supports multicasting;
and

construct a multicast routing table and a unicast routing table from the received link state packets, the ~~tables~~ multicast routing table corresponding to a short path tree through multicast routers, wherein the multicast routing table includes a plurality of routing entries, and wherein routing entries are placed in the multicast routing table by the computer program product only for link state advertisements having a multicast capable bit set in the link state advertisement indicating that the associated router is a multicast router.

18. (Original) The computer program of claim 17 further comprising instructions for performing reverse path forwarding using the multicast routing table.

19. (Original) The computer program of claim 17 wherein the link state advertisements comprise MOFPP (Multicast Open Short Path First) link state advertisements.

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20. (Original) The computer program of claim 17 wherein the multicast routing table correlates addresses of destination multicast capable routers with addresses of multicast capable routers on a short path tree of multicast capable routers.

d/ 21. (Cancelled)

22. (Original) The computer program of claim 17 wherein multicast routing comprises multicast routing using the Protocol Independent Multicasting (PIM) protocol.
